

Branchiate Dorvilleidae (*Polychaeta*) from the North Pacific

Bathyal collections off Southern California and intertidal collections in Puget Sound, Washington, have produced two new forms of dorvilleids. They are unusual in possessing branchiae or branchiallike (vascular loop not apparent) structures. The presence of branchiae in dorvilleids widens the generally accepted definition of Dorvilleidae (Fauchald, 1977) and places the familial status of Iphitimidae in doubt. These problems will be discussed after a description of the two new species.

The first new species described herein was collected intertidally at several Puget Sound, Washington, beaches (as described in Armstrong et al., 1976). Specimens were obtained from 1.0 mm-sieved samples. The second species was collected with a box corer (0.42 mm screened) at 1140 m depth in Santa Catalina Basin, Southern California continental borderland (Jumars, 1976).

Jaws were dissected from several individuals. The terminology of the parts is discussed in Jumars (1974). Drawings and measurements were made with a camera lucida attachment for a Wild M20 microscope.

Protodorvillea pugettensis sp. nov.

(Fig. 1)

Material examined.—The holotype (AHF Poly 1259) and 14 additional specimens were externally examined. The holotype is from Carkeek Park, Seattle, Washington. The paratypes are from Carkeek Park (4, AHF Poly 1260), Lincoln Park (7, AHF Poly 1261), Point Wells (2, AHF Poly 1262) and West Point (1, AHF Poly 1263). All of these collection locations are in or near Seattle. Jaws are dissected from two of the paratypes.

Description.—The holotype measures about 4.6 mm long and is widest (0.3 mm) at the 4th setiger. The holotype, though broken into two pieces, is complete and consists of 48 setigers plus prostomium, peristomium, and pygidium. The sizes of the paratypes are comparable. The prostomium in all specimens is roughly pear shaped but is slightly compressed dorsoventrally (Fig. 1A). A pair of clavate antennae insert dorsally near the midpoint of the prostomium. A pair of biarticulate palps insert ventral to the shorter antennae. Two eyespots are present: one is located between each antenna and palp. The eyespots often fade in preservative. The peristomium is composed of two rings which are fused dorsally. A single branchiallike structure (Fig. 1C) inserts dorsally on parapodia 3 through 10 to 14, greater numbers being found on larger specimens. The branchiallike structures arise fully developed on parapodium 3 and remain fully developed through all the parapodia on which they occur. Dorsal cirri are absent. A short, digitate ventral cirrus is present and fully developed on all parapodia (Fig. 1C). A second cirrus-like protuberance is weakly present ventrally on most parapodia. Parapodia are uniramous. The setae above the aciculum include one denticulate capillary and one furcate seta (Figs. 1D and 1E, respectively). The setae below the aciculum are all compound: one with an elongate, tapering, denticulate blade (Fig. 1G) and

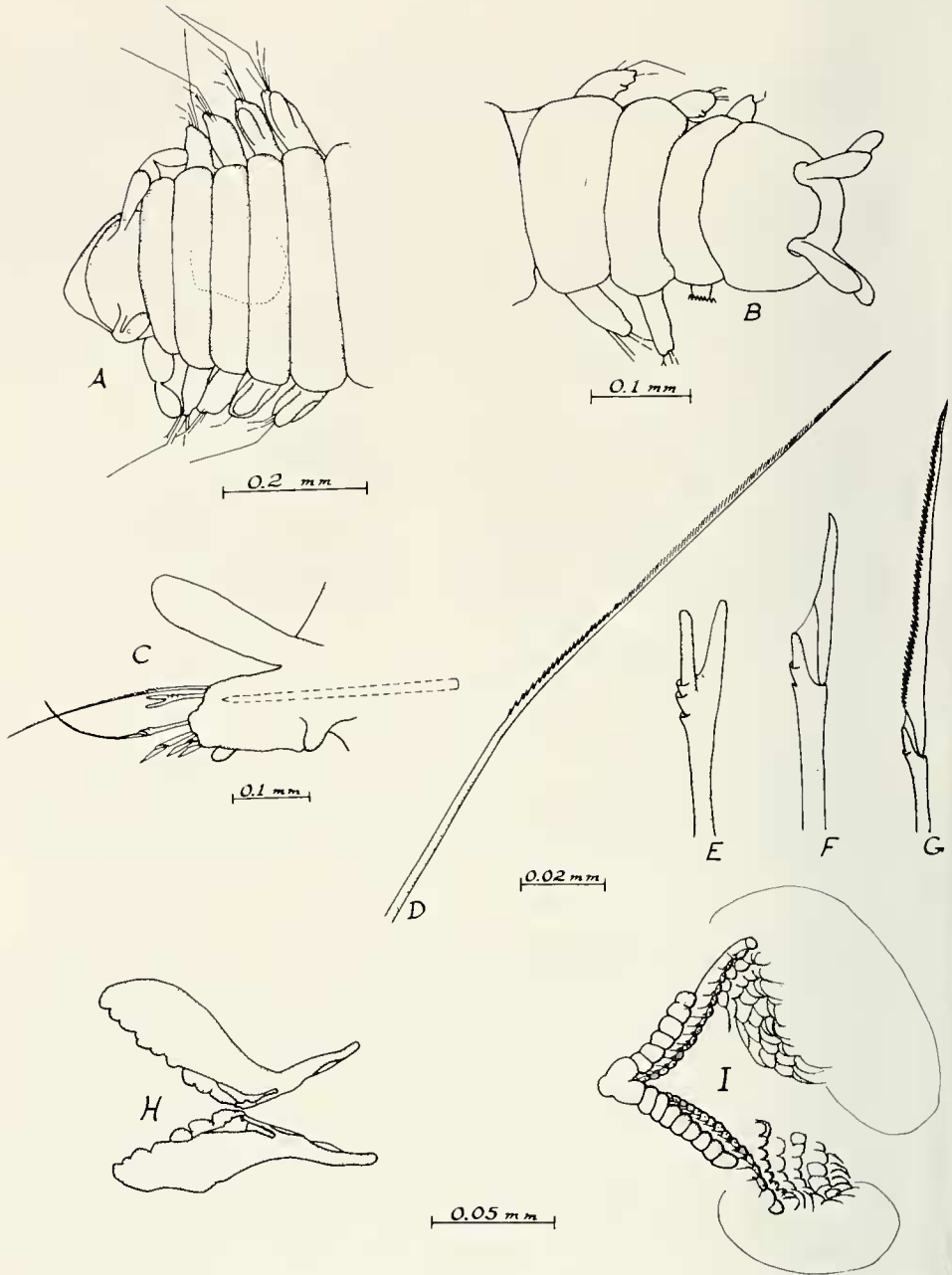


Fig. 1. *Protodorvillea pugettensis* sp. nov.: A, anterior in dorsal view (dashed lines indicate position of jaws); B, posterior of same specimen in dorsal view; C, parapodium 7; D, simple seta of parapodium 42; E, furcate seta of parapodium 19; F, short compound seta of parapodium 19; G, elongate compound seta of parapodium 42; H, mandibles in dorsal view; I, maxillae in dorsal view. A and B are drawn from the holotype while C-I are from paratypes.

three with short blades (Fig. 1F). One to four ridges are present on the distal ends of the shafts of the compound and furcate setae. The pygidium is rounded and bears four clavate cirri of approximately equal length (Fig. 1B). A dorsal, shelllike anal flap covers the terminal anus.

The jaws are not apparent through the body wall because they are surrounded by a dense muscular mass. The mandibles are butterfly shaped, anteriorly rounded and medially denticulate (Fig. 1H). The maxillae consist basically of four rows of denticles, two on each side (Fig. 1I). Additionally, there are several rows of accessory denticles anterior and inferior to the four principal rows. The carriers appear fused with each other and with the basal plates of the superior rows of denticles, and these in turn appear fused with the basal plates of the inferior rows. All the denticles have minute teeth distributed uniformly over their dorsal surfaces. In addition, denticles of the inferior rows have a larger main fang posterodorsally, followed by one, two, or rarely three, smaller fangs and several minute teeth.

The gut is apparently empty in all available specimens.

Differential diagnosis.—Comparisons between the above species and the only known dorvilleid with branchialike structures, *Protodorvillea parva*, are difficult because the description of *P. parva* is based upon a single, possibly juvenile specimen (Rullier, 1974). *P. pugettensis* differs from *P. parva* in the following ways: its antennae insert posterior to the midpoint of the prostomium rather than anterior to the midpoint; the two peristomial rings are fused dorsally; four pygidial cirri are present rather than two; the branchialike structures begin on the third rather than the first parapodium; the globular, cirruslike protuberance located on the proximal end of most parapodia appears to be lacking in *P. parva*; and minor differences appear to exist between the shorter compound and capillary setae of the two species. Comparisons of the maxillae were not possible because no specimens of *P. parva* were available for dissection.

Distribution.—*P. pugettensis* is known only from eastern central Puget Sound, Washington. It was collected in the intertidal zone in mixed sand, gravel and cobble substrates between mean lower low water (MLLW) and 1.8 m above MLLW.

Protodorvillea dibranchiata sp. nov.
(Fig. 2)

Material examined.—The holotype (AHF Poly 1264) and one paratype (AHF Poly 1265) were externally examined. The former came from a core at 32°57.7'N, 118°22.2'W and the latter was similarly collected at 32°58.3'N, 118°22.2'W. The anterior end of the paratype was mounted whole. Jaws were dissected from the paratype.

Description.—The holotype is comprised of two fragments. The anterior fragment consists of the prostomium, peristomium and 30 setigers. This fragment is 3.4 mm long and is widest (0.4 mm) at the third setiger. The posterior fragment is 2.4 mm long and consists of 17 setigers and the pygidium. The posterior end of the paratype is lacking. The prostomium of both specimens is rounded and slightly compressed dorsoventrally (Fig. 2A). A pair of clavate antennae insert dorsally on the prostomium. In both specimens, the right antenna is nearly bi-

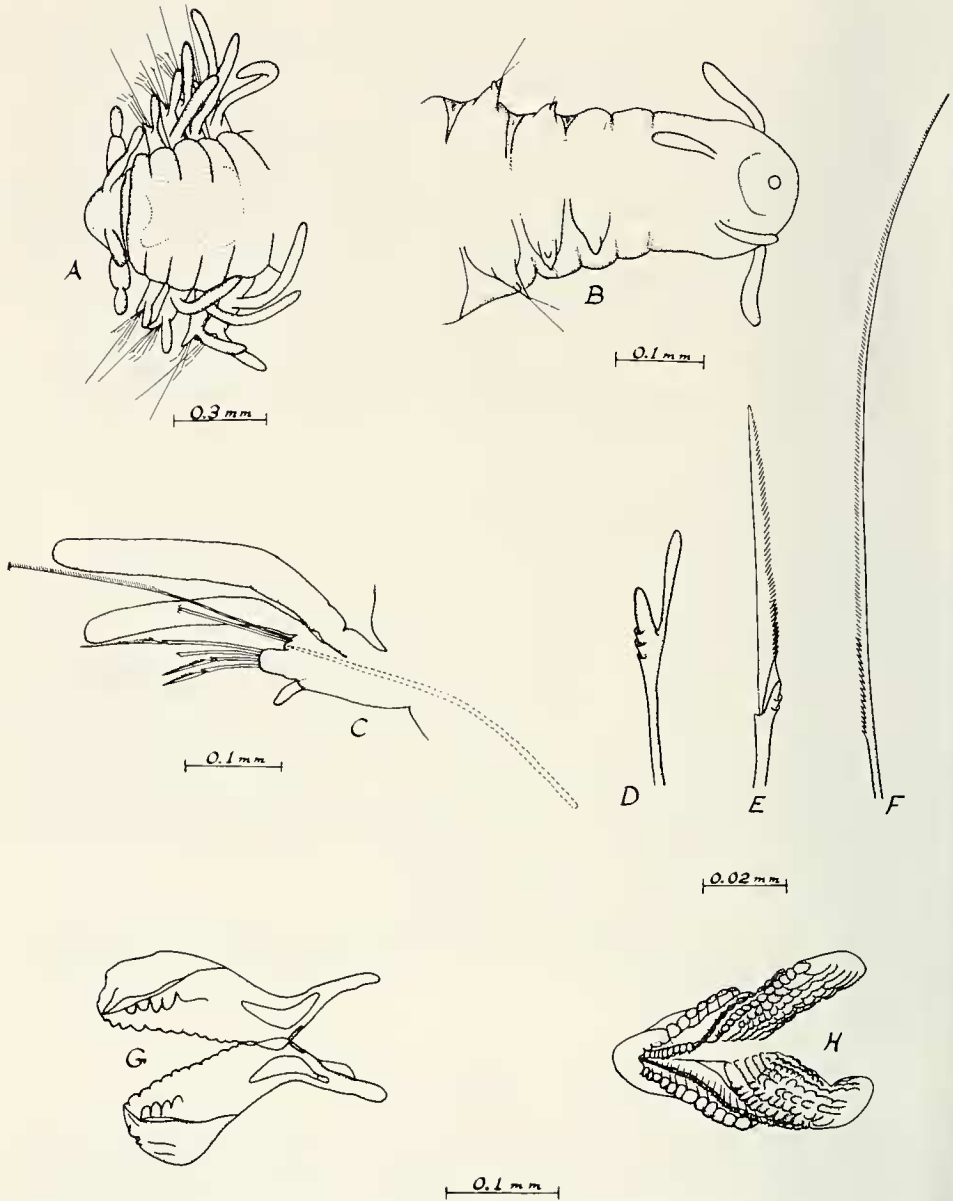


Fig. 2. *Protodorvillea dibranchiata* sp. nov.: A, anterior in dorsal view (dashed lines indicate position of jaws); B, posterior in ventral view; C, parapodium 10; D, furcate seta; E, compound seta; F, simple seta; G, mandibles in dorsal view; H, maxillae in dorsal view. B is drawn from the holotype while A and C-H are from the paratype.

articulate, and the left antenna is shorter and shows less distinct articulation. A pair of biarticulate palps insert ventral to the antennae. Eyes appear to be absent. The peristomium is composed of two rings, the first narrower than the second. Branchiae are present on the first 13 to 17 parapodia. The first parapodium has

one branchia which inserts dorsally at the distal end of the parapodium. The second parapodium also has a dorsal proximal branchia as well as the distal. These two branchiae are present and increase in size on successive parapodia, being fully developed by parapodium five (Fig. 2C). Both branchiae gradually decrease in size from about the 14th through the 17th parapodia in the holotype and from the 11th through the 13th parapodia in the paratype. The proximal branchia is absent by parapodium 18 in the holotype and parapodium 14 in the paratype. The distal branchia persists as a globular "dorsal cirrus" on all remaining posterior parapodia. A digitate ventral cirrus (Fig. 2C) is present and fully developed on all but the first parapodium. The setae above the aciculum include one denticulate capillary and one furcate seta (Figs. 2F and 2D, respectively). There are three to four compound setae with elongate, denticulate blades below the aciculum (Fig. 2E). Two to three ridges are present on the distal ends of the shafts of the compound and furcate setae. All of these setae are present on each parapodium. The pygidium (Fig. 2B) is rounded and bears four elongate, clavate cirri, the two dorsal cirri being longer than the ventral ones. A conical depression surrounds the anus.

The mandibles are butterfly shaped, anteriorly rounded and medially denticulate (Fig. 2G). The maxillae consist of four rows of denticles, two on each side (Fig. 2H). There are several rows of accessory denticles anterior and inferior to the four principal rows. The carriers appear fused with each other and with the basal plates of the superior rows of denticles, and these in turn appear fused with the basal plates of the inferior row. All the denticles bear minute teeth distributed uniformly over their dorsal surfaces. In addition, denticles of the inferior rows have a large posteriodorsal main fang, followed by three to four smaller fangs and several minute teeth.

The gut is apparently empty in both specimens.

Differential diagnosis.—*P. dibranchiata* differs from all previously described dorvilleids by the presence of paired branchiae on each parapodium, beginning on the second and persisting through the 13th to 17th parapodia.

Distribution.—*P. dibranchiata* is known only from the Santa Catalina Basin at bathyal depths.

Discussion

The two descriptions above widen the range of jaw morphologies found in Dorvilleidae. The several accessory rows of denticles have not been described before. On the basis of Jumars' (1974) description we suspect, however, that the jaw structure of *P. gaspeensis* may be similar. Unfortunately, insufficient material was available to perform additional dissections on this species.

The finding of branchiae in Dorvilleidae, in *P. parva* first by Rullier (1974) and now in two additional species, also forces a widening of the definition of Dorvilleidae. At the same time, the finding of a new species of *Iphitime* (*I. hartmanae* Kirkegaard 1977) which is not limited to crab branchial cavities broadens the concept of Iphitimidae and makes the family less distinct from Dorvilleidae. Although *Iphitime* remains distinct as a genus, we can no longer find reasonable criteria for excluding it from Dorvilleidae. *Iphitime's* jaw morphologies, setae, presence of branchiae, and number of prostomial appendages, when considered

separately, all fall within the known range of Dorvilleidae as described by Jumars (1974) and herein.

References

- Armstrong, J. W., C. P. Staude, R. M. Thom, and K. K. Chew. 1976. Habitats and relative abundances of the intertidal macrofauna at five Puget Sound beaches in the Seattle area. *Syesis*, 9:277-290.
- Fauchald, K. 1977. The polychaete worms. Definitions and keys to the orders, families and genera. Natural History Museum of Los Angeles County, California. 188 pp.
- Jumars, P. A. 1974. A generic revision of the Dorvilleidae (Polychaeta), with six new species from the deep North Pacific. *Zool. J. Linn. Soc.*, 54(2):101-135.
- . 1976. Deep-sea species diversity: Does it have a characteristic scale? *J. Mar. Res.*, 34:217-246.
- Kirkegaard, J. B. 1977. A new species of *Iphitime* (Polychaeta: Iphitimidae) living under the tail of *Hyas* (Crustacea: Decapoda) in the Oslo Fjord. Pp. 199-209 in *Essays on polychaetous annelids in memory of Dr. Olga Hartman*. (D. J. Reish and K. Fauchald, eds.), Allan Hancock Foundation, University of Southern California, Los Angeles, California.
- Rullier, F. 1974. Quelques Annélides Polychètes de Cuba recueillies dans les Éponges. *Trav. Mus. Histoire Nat. "Gr. Antipa,"* 14:9-77.

John W. Armstrong, *College of Fisheries, University of Washington, Seattle, Washington 98195*. Present address: Environmental Resources Section, Seattle District, U.S. Army Corps of Engineers, P.O. Box C-3755, Seattle, Washington 98124. Peter A. Jumars, *Department of Oceanography, University of Washington, Seattle, Washington 98195*.

Accepted for publication September 12, 1978.

Bull. Southern California Acad. Sci.
77(3), 1978, pp. 138-142

Additions to the Cerambycidae of the Revilla Gigedo Islands (Coleoptera)

Four species of Cerambycidae have been previously reported from the Revilla Gigedo Islands (Linsley and Chemsak, 1966). Although this oceanic island group consists of four islands, Cerambycidae are known to occur on only two: *Stenodontes dasytomus socorrensis* Linsley and Chemsak and *Acanthoderes socorrensis* Linsley on Socorro Island and *Nesodes insularis* Linsley and *Acanthoderes peritapnoides* Linsley on Clarion Island.

This report is based upon material collected by C. Hogue and A. Evans on Socorro Island during the Steele Expedition of 1977. The specimens of Cerambycidae were made available for study by C. Hogue through the Los Angeles County Museum of Natural History. Types will be deposited at that institution.

The authors gratefully acknowledge National Science Foundation support for this and related studies under Grant GB-BM574. Celeste Green prepared the illustrations.

Permission to carry out scientific studies in the area were kindly authorized by Dr. Antonio Landázuri, Dirección General de la Fauna Silvestre, Secretaría de Agricultura y Recursos Hidráulicos, México.